

# PATENT ABSTRACTS OF JAPAN

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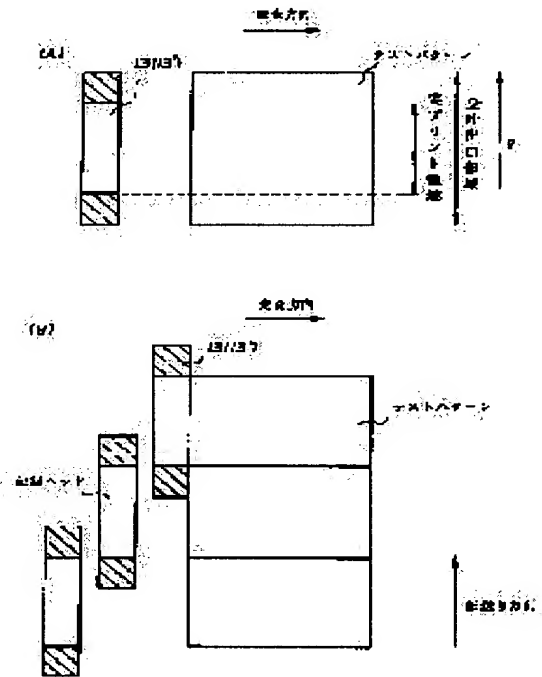
(21)Application number : **06-038818** (71)Applicant : **CANON INC**  
 (22)Date of filing : **09.03.1994** (72)Inventor : **MIURA YASUSHI**  
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## (54) PRINTING DEVICE AND PRINTING METHOD

### (57)Abstract:

**PURPOSE:** To print a test pattern only for one single line, and correct unevenness in the density based on the test pattern, in a printing device.

**CONSTITUTION:** When printing a test pattern by scanning with ink jet heads 13, 13', the ink jet heads 13, 13' are equipped with more discharge orifices than required for printing an actual print area, and the test pattern is printed using all the discharge orifices including such extra discharge orifices. In addition, a correction table is rewritten concerning the discharge orifices corresponding to the actual print area based on the reading result of the density of the test pattern, and thus the density



unevenness is corrected. Consequently, the readings at the terminal part of the actual print area show no value deterioration and therefore, the satisfactory correction of a unevenness in the density at the terminal discharge orifice is achieved.

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## LEGAL STATUS

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[Date of registration]

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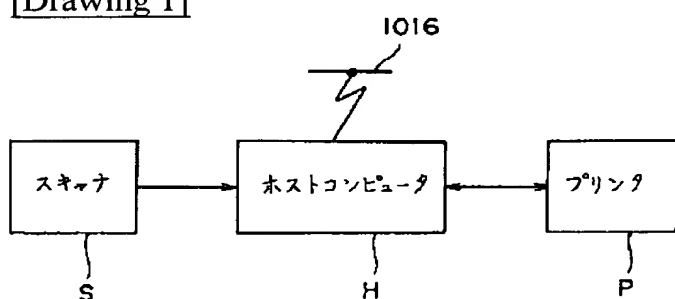
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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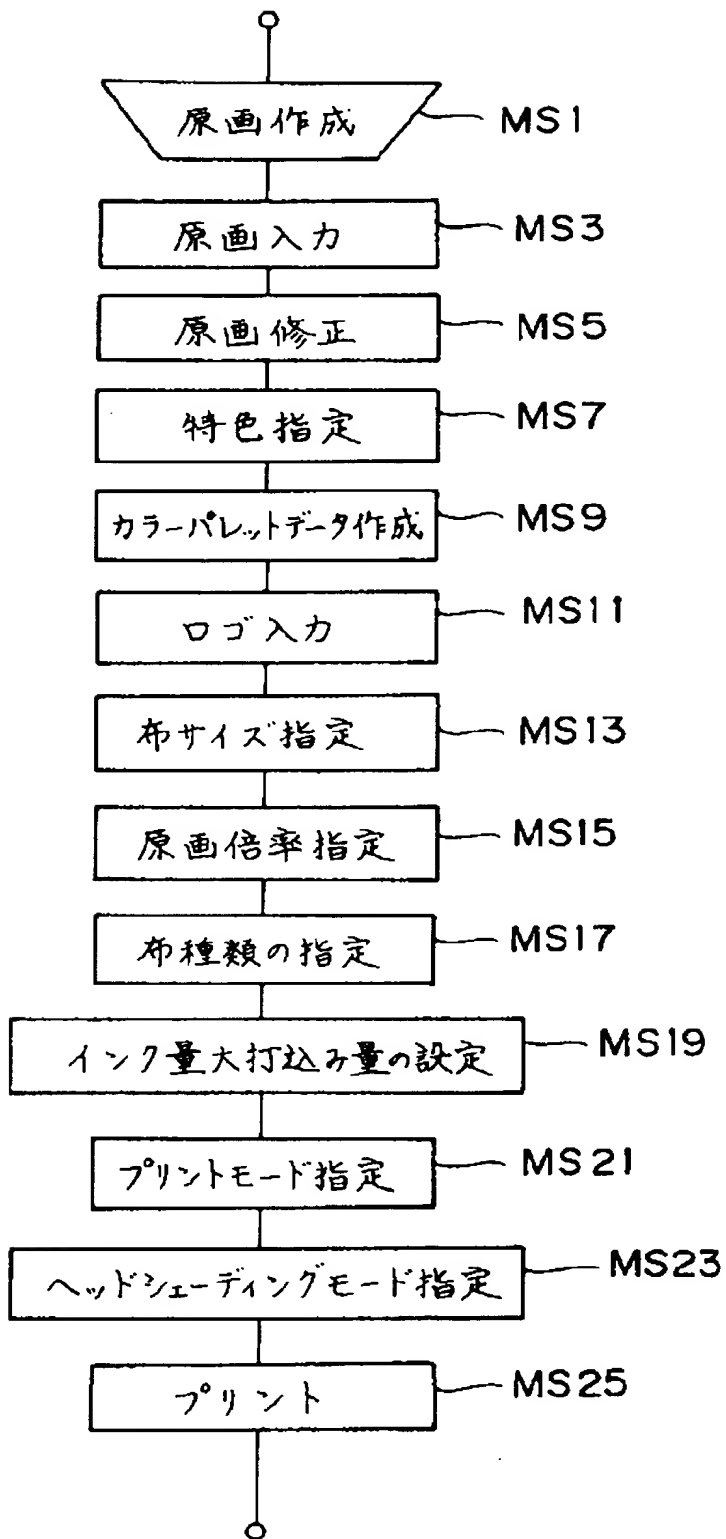
**DRAWINGS**

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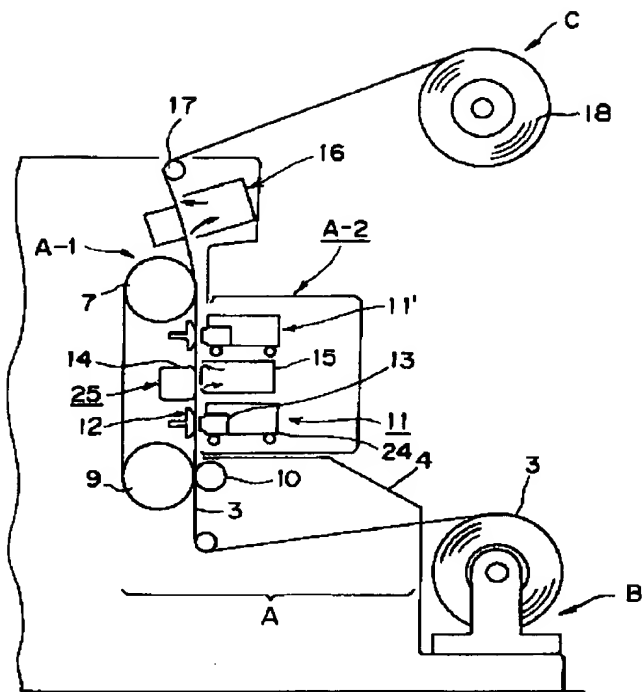
[Drawing 1]



[Drawing 2]

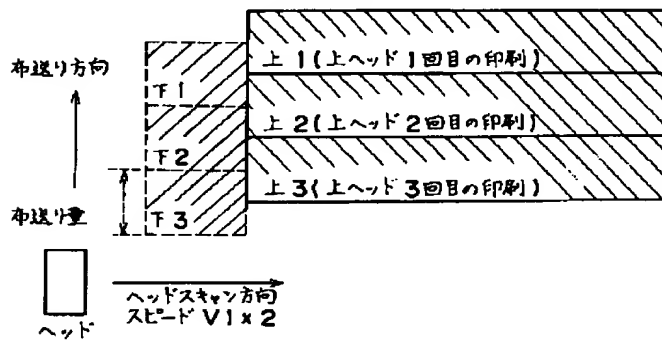


[Drawing 4]

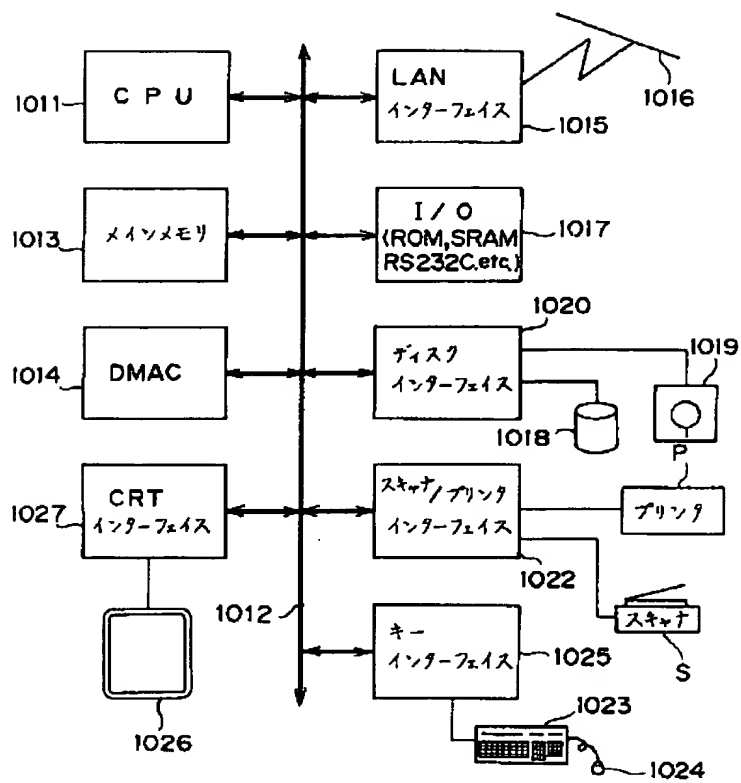


[Drawing 11]

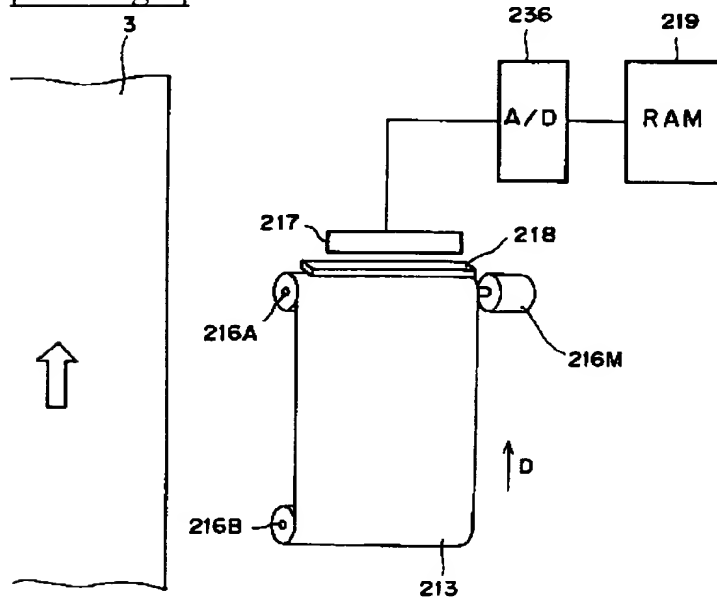
2回マルチスキャン (間引きあり)



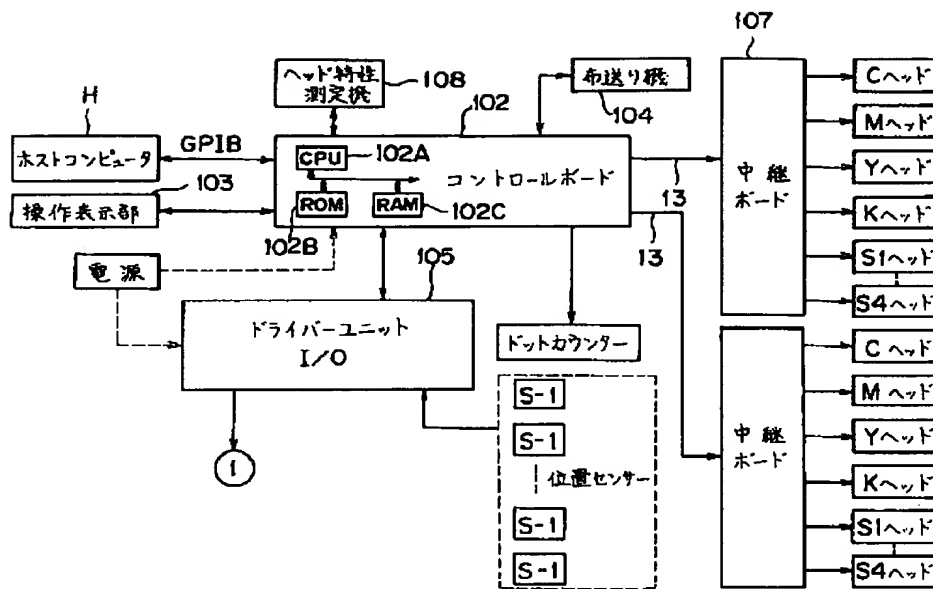
[Drawing 3]



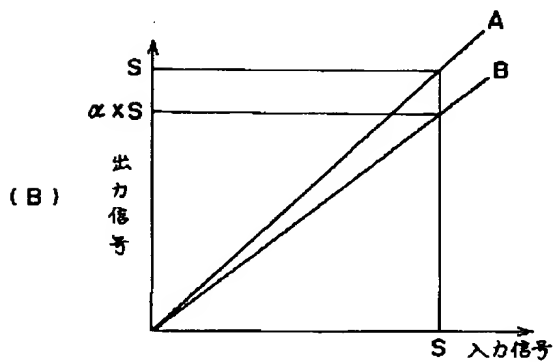
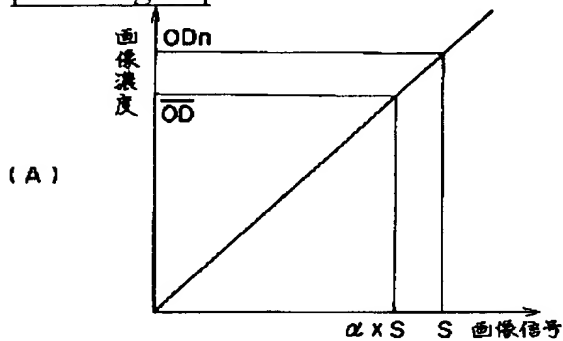
[Drawing 5]



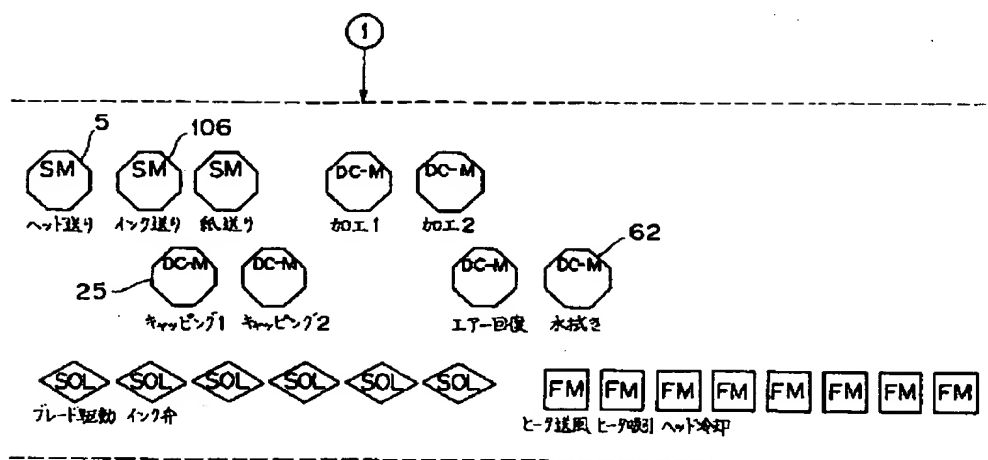
[Drawing 6]



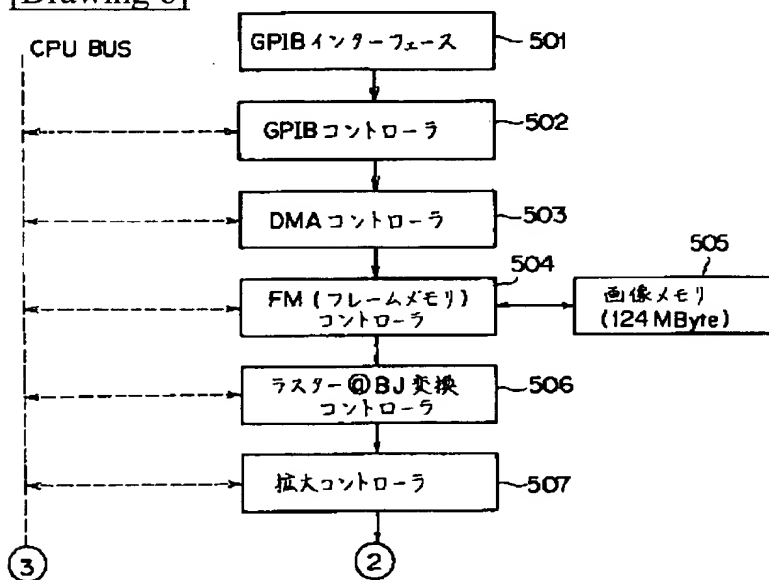
[Drawing 15]



[Drawing 7]

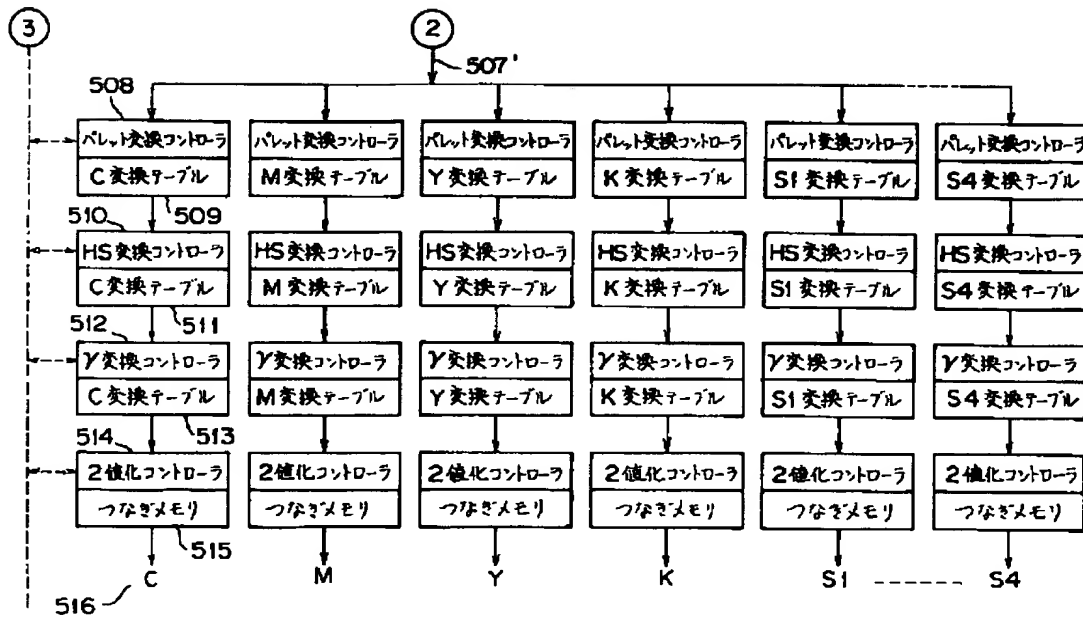


[Drawing 8]



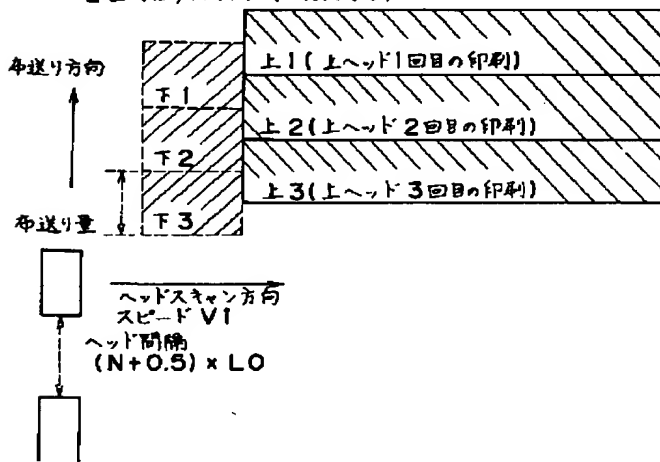
[Drawing 9]





[Drawing 12]

2回マルチスキャン (間引きなし)

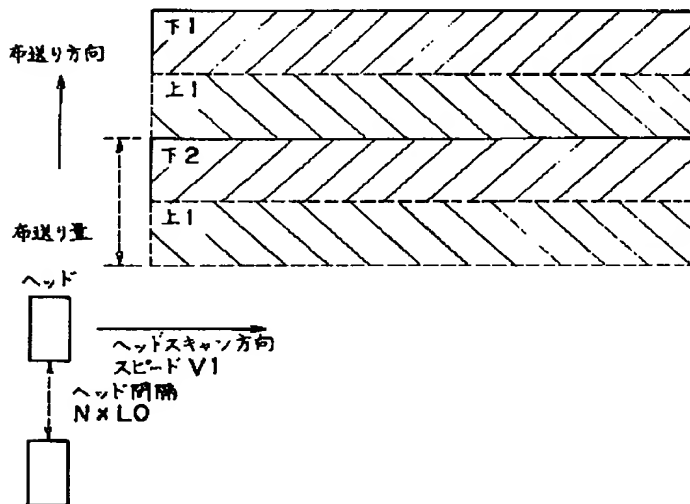


[Drawing 10]



[Drawing 13]

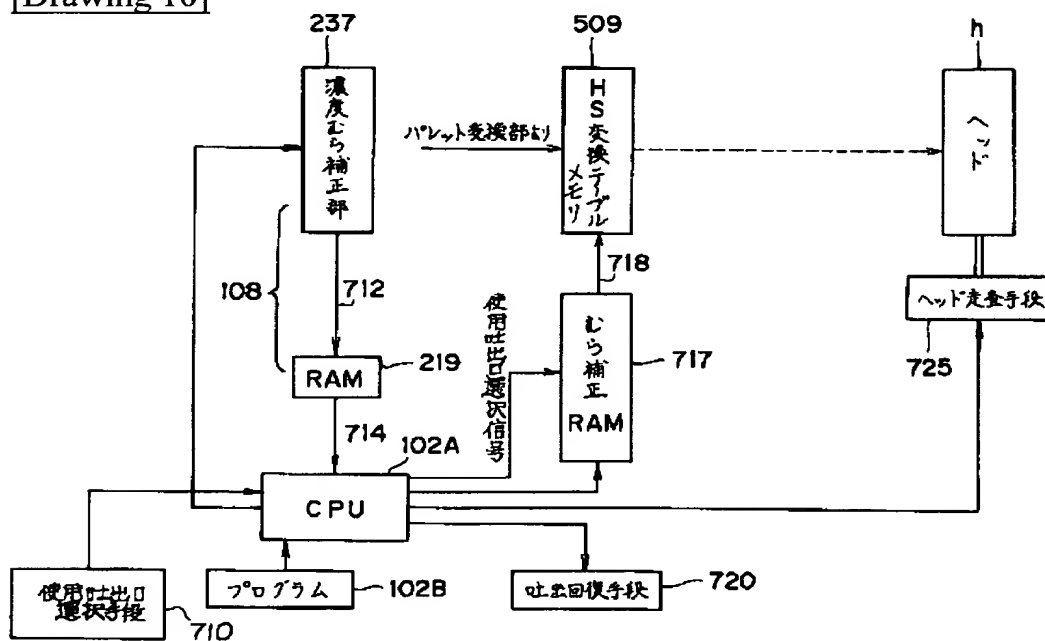
高速印字 (マルチスキャンなし, 間引きなし)



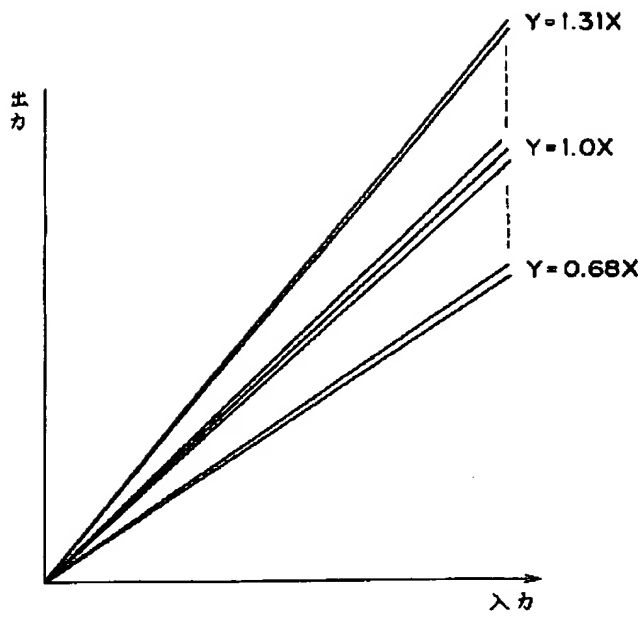
[Drawing 14]



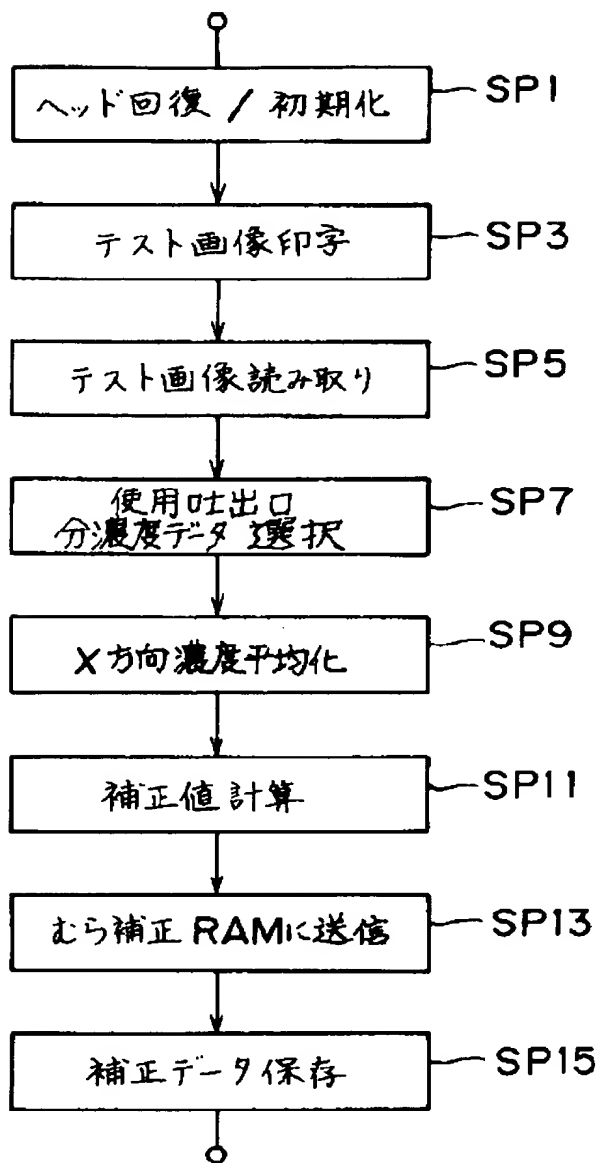
[Drawing 16]



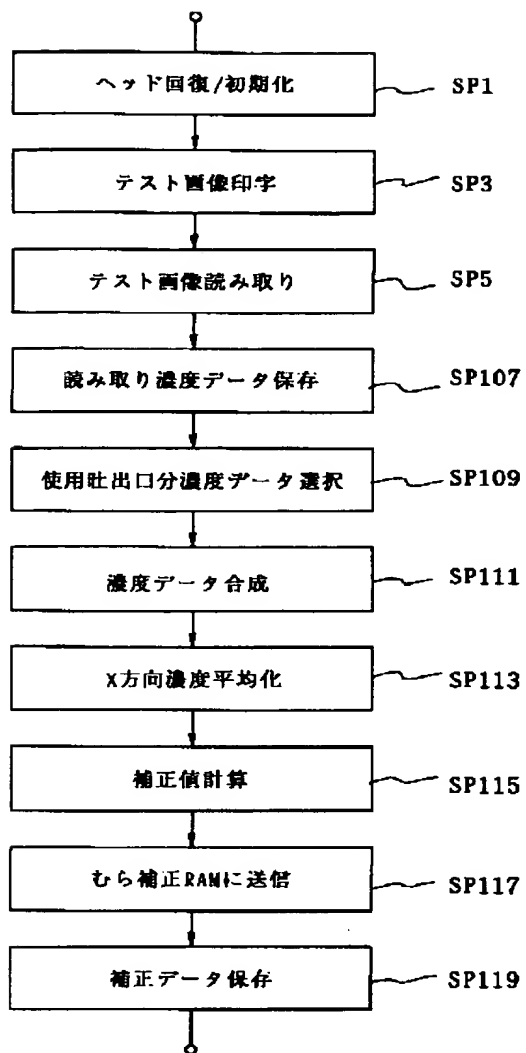
[Drawing 17]



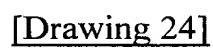
[Drawing 18]



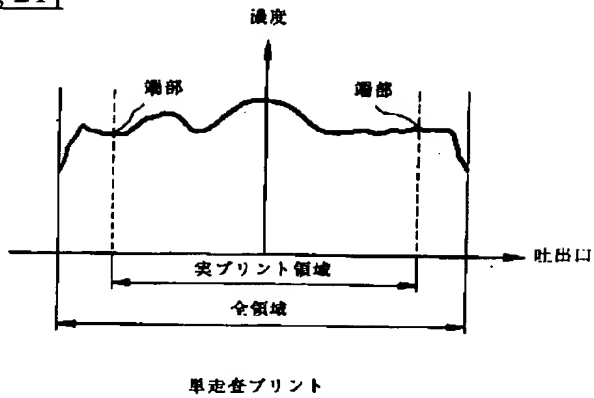
[Drawing 19]



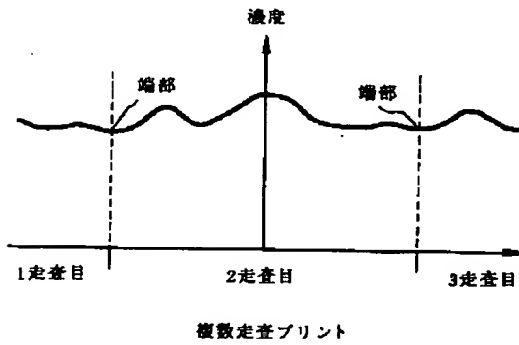
[Drawing 20]



[Drawing 21]  
(A)



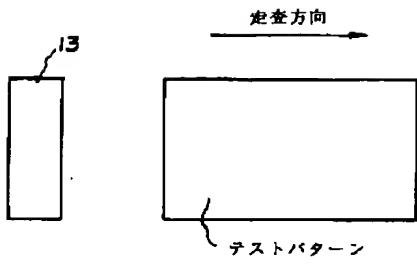
(B)



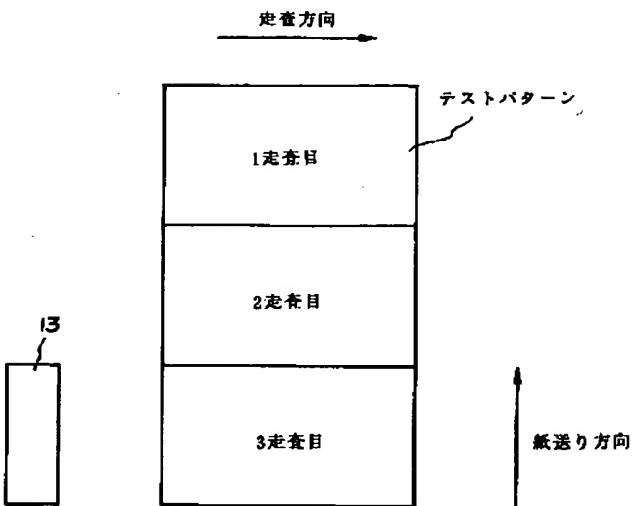
[Drawing 22]



(A)

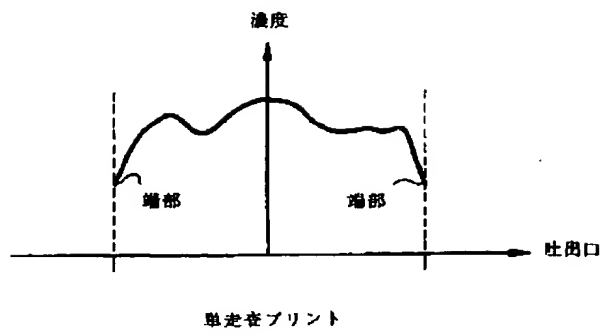


(B)

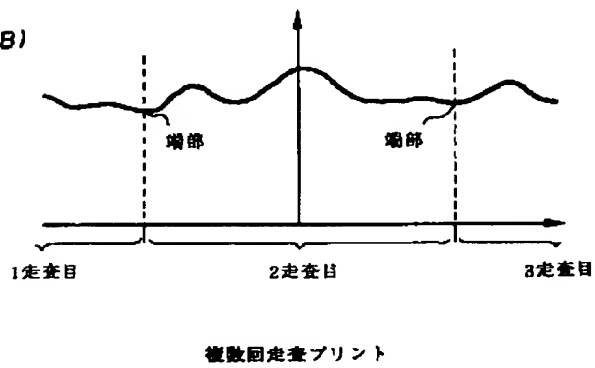


[Drawing 23]

(A)



(B)



[Translation done.]

DETAILED DESCRIPTION [Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the textile-printing system which performs image formation especially on a textile about the printing equipment which forms an image on a print medium.

[0002]

[Background of the Invention] What performs a digital image print as an image output unit using the print head by the ink jet method, a hot printing method, etc. is spreading quickly. In such an image output unit, it is common to use the print head (henceforth a multi-head in this term) which comes to carry out the accumulation array of two or more print components because of improvement in a print rate.

[0003] For example, in an ink jet print head, the so-called multi-nozzle head which accumulated two or more ink deliveries and liquid routes is common, and that on which two or more heaters [ thermal head / of a hot printing method and a sensible-heat method ] are accumulated is used.

[0004] However, it originates in dispersion in a manufacture process, dispersion of a head component, etc., and it is difficult to manufacture the print component of a multi-head to homogeneity, and a certain amount of dispersion arises in the property of each print component. For example, in the above-mentioned multi-nozzle head, dispersion arises in the configuration of a delivery, a liquid route, etc., and dispersion arises in the configuration of a heater, resistance, etc. also in a thermal head. And the ununiformity of the property between such print components turns into the magnitude of a dot and the ununiformity of concentration which are printed by each print component, appears, and makes a print image produce concentration unevenness after all.

[0005] To this problem, in JP,3-18358,A and others, these people prepared the concentration unevenness read station in image formation equipment, and have proposed the equipment which reads the concentration unevenness distribution in the print component array range periodically, and re-created concentration unevenness amendment data. Since according to this amendment data are re-created according to it even if concentration unevenness distribution of a head changes, the uniform image which is always uniform can be maintained.

[0006] Moreover, the example of 1 configuration of the concentration unevenness amendment in a textile-printing system is similarly indicated by Japanese Patent Application No. No. 190052 [ five to ] by these people. This example prepares the concentration unevenness amendment section which consists of a read station which reads the test pattern print section which

prints the test pattern for concentration unevenness amendment, and this test pattern outside a print field, and becomes possible [ using for a test pattern print a different print medium by this from the print medium actually used for a print ].

[0007]

[Problem(s) to be Solved by the Invention] However, also in any of two examples of the concentration unevenness amendment mentioned above, when a test pattern was printed, the test pattern which scans multiple times and consists of a multi-line needed to be printed. This is because it is difficult to amend these both ends appropriately in the case of the test pattern printed by one scan. The reason is explained.

[0008] Drawing 22 (A) and (B) are drawings showing print actuation of the test pattern by the scan of 1 time and multiple times, respectively, and drawing 23 (A) and (B) are drawings showing the read result of the test pattern by which the print was carried out [ above-mentioned ], respectively.

[0009] When printing a test pattern by multiple-times scan, as the pattern printed by each scan touches a boundary mutually as shown in drawing 22 (B), and shown in this drawing (A), the boundary of the test pattern by one scan will touch the non-printing section of a print medium.

[0010] For example, although the ink driven in on the print medium spreads in the print of an ink jet method and dot formation is performed, how in which a dot spreads by whether there is any contiguity dot differs at this time. Moreover, also when reading a test pattern, on the boundary of a print field, it will be influenced [ many ] of the concentration of a print medium.

[0011] For this reason, as shown in drawing 23 (A) and (B), the read result of a single scan print differs from the read result of a multiple-times scan print notably [ near the boundary of each scan field ] especially. Thus, when concentration unevenness amendment is performed based on the read result of a single scan print, amendment about the delivery in the edge of an ink jet head can be performed appropriately.

[0012] Although the test pattern which consists of a multi-line was needed from the above reason, this had also derived the following troubles to coincidence.

[0013] 1) That is, since a multi-line is printed, the time amount which the print of a test pattern takes time amount to and concentration unevenness amendment takes may become long.

Especially, like the textile-printing system using various ink, when there are many ink jet heads, the print time amount of a test pattern will increase notably.

[0014] 2) Moreover, when it is possible to change a print medium and the print medium of a test pattern like the textile-printing

system shown above, the conveyance device of the medium for test patterns will be separately needed for a multi-line print, and a conveyance system comparable as the conveyance device of a print medium will also be needed, and the cost rise of equipment will be brought about.

[0015] It is in offering the printing equipment which this invention is made in view of the above-mentioned problem, and the place made into the purpose does not perform the test pattern print of multiple times, but can perform good concentration unevenness amendment only based on the test pattern of one line (line).

[0016]

[Means for Solving the Problem] Therefore, in this invention, it sets to the printing equipment which prints on recorded media using a recording head with two or more record components. A record component selection means to choose the record component used for a print from said two or more record components, A test image print means to print a test image using record components other than the record component chosen by this record component selection means, and the selected component concerned, It is characterized by having a read means to read the test image printed by this test image print means, and an amendment means to amend the driving signal of the record component used for said print based on the read result of this read means.

[0017]

[Function] According to the above configuration, a test image is printed using many numbers of record components, it disappears by this that the part corresponding to the record component used for an actual print in a test image serves as an edge of the test image concerned from the record component used on a print, and the effect of being the image edge can be eliminated in the read result.

[0018]

[Example] Hereafter, the example of this invention is explained to a detail with reference to a drawing.

[0019] In addition, below, the following procedure explains the textile-printing system as a suitable example of this invention.

[0020] (1) The whole of a system ( drawing 1 - drawing 2 )

(2) Host computer ( drawing 3 )

(2.1) Configuration (2.2) actuation (3) printer ( drawing 4 - drawing 21 )

(3.1) explanation (4) of explanation (3.4) head shading of the explanation (3.3) print method of the explanation (3.2) equipment configuration of a print station -- in addition to this, the general drawing 1 of (1) system shows the whole textile-printing system configuration concerning one example of this invention. A host computer H constitutes the data feeder which supplies the

subject-copy data for textile printing, other control command, etc. to the printer P which prints to print media, such as cloth, (henceforth a print and printing). Using this host computer H, it can be created by the designer, desired correction can be added to the subject copy read with Scanner S, and it can be made to print by setting up a necessary parameter to Printer P. It can combine with LANs (Local Area Network)1016, such as Ethernet (based on XEROX), and a host computer H can enable communication with other systems etc. again. Moreover, to a host computer H, the condition etc. is notified from Printer P. About a host computer H, the detail is later mentioned [ Printer / P / drawing 3 and ] using drawing 4 etc.

[0021] Drawing 2 shows an example of the textile-printing procedure which can be performed using this system. The contents of processing performed at each step are as follows.

[0022] It is the step which creates the basic image with which subject-copy creation step MS1 designer becomes the base unit of the repetition image on the cloth which is a subject copy, i.e., a print medium, using a proper means. In the creation concerned, necessary each part, for example, the input means, a necessary display means, etc. of the host computer H explained in full detail per drawing 3 can also be used.

[0023] They are the step which reads into a host computer H the subject copy created at the subject-copy input step MS3 manuscript creation step MS 1 using Scanner S, the step which reads the subject-copy data stored in the external memory of a host computer H, or the step which receives subject-copy data from LAN1016.

[0024] Although the textile-printing system in the example of five subject-copy correction steps MS enables selection of various repetition patterns to a basic image so that it may mention later about drawing 24 , depending on the selected repetition pattern, the discontinuity of a location gap of an unwilling image or a color tone may arise in the boundary section. This step is a step which makes the discontinuous correction [ in / repeatedly / the boundary section of a pattern ] according to the selection concerned while receiving selection of a repetition pattern. Referring to the screen of the indicator which a host computer H has as a mode of the correction, a designer or an operator may carry out using the input means of a mouse and others, and may make automatic correction by the image processing of the host computer H itself.

[0025] the printer P specially applied to the example of seven color specification steps MS -- fundamental -- yellow (Y), a Magenta (M), and cyanogen (C) -- or -- although further printed using the ink of black (BK) -- textile printing -- setting -- clear red (R) and Green, the colors, for example, which golden

and silver metal color, other than these, -- use of (G), blue (B), etc. may be desired. Then, in the printer P of this example, while enabling the print using the ink of these special colors (henceforth the special feature), the special feature is specified in this step.

[0026] In color palette data origination step MS9 design, a designer creates a subject copy, choosing a color from a standard color patch. The repeatability of the color at the time of the print to the selection color concerned influences the productivity of a textile-printing system greatly. So, at this step, the data which define the mixed ratio of the Y, M, C, or the special feature for reproducing the selected standard color good are generated.

[0027] In LOGO input step MS11 bolt of cloth, logo marks, such as a brand of a designer and a manufacturer, are printed on an edge in many cases. At this step, assignment of assignment of such a logo mark and its color, size, and a location etc. is performed.

[0028] The width of face of the cloth which is a candidate for cloth size assignment step MS13 print, die length, etc. are specified. Thereby, the amount of scans in the main scanning direction of the print head in Printer P and the direction of vertical scanning, the number of cycles of a subject-copy pattern, etc. become settled.

[0029] The rates of variable power at the time of the print to subject-copy scale-factor assignment step MS15 subject copy (for example, 100%, 200%, 400 etc.%, etc.) are set up.

[0030] There are various classes of cloth class assignment step MS17 cloth, such as synthetic fibers, such as natural fibers, such as cotton, silk, and hair, and nylon, polyester, an acrylic, and it differs in the property in connection with textile printing. And although it is thought that it is based on the elasticity of cloth, in making equal the feed per revolution at the time of a print, how depending on which \*\*\*\* generated in the boundary section for every horizontal scanning appears differs. Then, the class of cloth concerning a print is inputted and it is made to present a setup of the suitable feed per revolution in Printer P at this step.

[0031] the amount setting step MS 19 of the ink maximum placing -- although the same quantity of ink is driven in on cloth, the image concentration made to reproduce on cloth changes with \*\*\*\*. Moreover, the amount of ink which can be driven in changes with configurations of the fixing system in Printer P etc. So, at this step, the amount of the ink maximum placing is specified according to a cloth class, the configuration of the fixing system of Printer P, etc.

[0032] It specifies whether the mode in which perform the high-speed (refer to drawing 13) printing mode which does not

perform the heavy print by the multi-scan in the designate print mode step MS21 printer P, or the heavy print (reference, such as drawing 11 and drawing 12 ) by the multi-scan is performed is performed, one ink placing is performed to 1 dot, or ink placing of multiple times is performed. Furthermore, when a print is interrupted, it can specify whether a print is newly started independently as the continuity of whether it controls so that a shank continues before and after interruption, and a shank.

[0033] It is processing concerning head shading mode assignment step MS23 this invention. Namely, when using the print head which has two or more deliveries in Printer P, ink discharge quantity, dispersion of a discharge direction, and \*\*\*\* may arise for every delivery of a head by dispersion on manufacture, a subsequent busy condition, etc. Then, processing (head shading) which amends the driving signal for every delivery that this should be amended, and makes print density regularity may be performed. It enables it to specify the mode of head shading according to the above-mentioned printing mode, the timing of head shading, etc. at this step.

[0034] Based on 25 or more print steps [ MS ] assignment, textile printing is performed by Printer P.

[0035] In addition, as long as it is unnecessary to perform assignment etc. above, you may make it delete or skip the step. Moreover, the step which performs other assignment etc. if needed may be added.

[0036] (2) The host computer (2.1) block diagram 3 is a block diagram showing the whole system focusing on the configuration of the host computer concerning one example of this invention.

[0037] In drawing, the main memory which CPU to which 1011 performs control of the whole information processing system, and 1013 memorize the program which CPU1011 performs, or is used as a work-piece field in the case of this activation, and 1014 are DMA controllers (it is called Direct Memory Access Controller and Following DMAC) which perform a data transfer between main memory 1013 and the various devices which constitute this system, without minding CPU1011. It is an I/O device (henceforth I/O) with [ 1015 / the LAN interface between LAN1016 and this system ] ROM, SRAM, a RS232C method interface, etc. in 1017. I/O Various external instruments are connectable with 1017. 1018 and 1019 are each disk interface for a hard disk drive unit and a floppy disk drive unit, and 1020 to make signal connection between a hard disk drive unit 1018, a floppy disk drive unit 1019, and this system as external storage. 1022 is the scanner / printer interface for making signal connection between Printer P and Scanner S, and a host computer H, and can be made into the thing of a GPIB specification. It is key INTAFESU for a keyboard for 1023 to input various text, control information, etc. and 1024 to



make the mouse as a pointing device between a keyboard 1023, and a mouse 1024 and this system, and for 1025 make signal connection. 1026 is displays, such as CRT by which the display is controlled by INTAFESU 1027. 1012 is the data bus for making signal connection of between each above-mentioned device, a control bus, and a system bus that consists of an address bus.

[0038] (2.2) In the system constituted by connecting the various devices explained beyond actuation, a designer or an operator operates it, corresponding to the various information displayed on the display screen of CRT1026. Namely, LAN1016, I/O Actuation information which is stored in main memory 1013 and starts a system operation, such as the external instrument connected to 1017, a hard disk 1018, a floppy disk 1019, Scanner S, a keyboard 1023, an alphabetic character supplied from a mouse 1024, and image information, is displayed on the display screen of CRT1026, and a designer or an operator performs assignment of various information, directions actuation to a system, etc., looking at this display.

[0039] (3) The explanatory view 4 of a printer (3.1) mechanical configuration shows the example of a configuration of the ink jet printer as textile-printing equipment of this example. The textile-printing equipment (printer) of this example consists of the body section which advances the cloth feeding section B which sends out the cloth on the roll to which it roughly divided into and pretreatment for textile printing was performed, and the sent cloth in a precision, and prints with an ink jet head, and the rolling-up section C which is made to dry the printed cloth and is rolled round. And the body section A consists of the precision delivery section A-1 and the print unit A-2 of cloth which contain a platen further.

[0040] The textile (cloth) 3 of the shape of a pretreated roll is sent out to the direction of the cloth feeding section, and is sent to the body section A. The thin endless belt 6 by which a step drive is carried out is constructed about in a driving roller 7 and the winding roller 9 at a precision at the body section. The step drive of the driving roller 7 is direct carried out with the stepping motor (not shown) of a high resolution, and only the amount of steps carries out the step feed of the belt. The sent cloth is pushed against the belt front face backed up by the winding roller 9 with the forcing roller 10, and a print side is regulated evenly.

[0041] In the 1st print section 11, the cloth 3 carried out in the step feed with the belt is orientated by the platen 12 on the tooth back of a belt, and is printed by the ink jet head 13 from a side front. Whenever the print of one line finishes, a specified quantity step feed is carried out and, subsequently the warm air from \*\* / front face to eliminate dries with heating by

the heating plate 14 from a belt tooth back, and the warm air duct 15. Then, in 2nd print section 11', it piles up by the same approach as the 1st print section, and a print is made. In addition, the warm air duct 15 does not necessarily need to be formed, and even if it is the case where this is omitted, in the field which results in 2nd print section 11', an air drying is also made from the 1st print section 11. What has the component which generates the heat energy which makes ink produce film boiling as energy used in order to carry out the regurgitation of the ink is used for the ink jet head (print head) in this example.

[0042] After performing the above print, the process to which the coloring matter in ink, such as a color on textile fiber, is diffused using the means to which the coloring matter which ink contains succeedingly is fixed, and the coloring matter in ink is fixed to fiber can be given. And according to this process, sufficient color enhancement and the robustness by fixing of a color can be acquired.

[0043] A conventionally well-known approach is sufficient as this diffusion and a fixing process (a dye diffusion process, a fixing coloring process, etc. are included in this), and the steaming method (for example, it processes for 10 minutes under a 100-degree C steam ambient atmosphere) etc. is mentioned. In addition, alkali treatment may be beforehand performed to a textile as pretreatment in front of a print process in this case. Moreover, a fixing process has what includes reaction processes, such as ionic bond, by the color, and the thing which is not included. There are some from which fiber is infiltrated and it does not secede physically as a latter example. Moreover, if necessary coloring matter is contained as ink, a proper thing can be used, and it is not restricted to a color, but a pigment may be included.

[0044] Then, in a tail end process, removal of the matter used for removal and pretreatment of an unreacted color is performed. Finally, a print is completed through arrangement finishing processes, such as defective amendment and iron finishing.

[0045] Drawing 5 shows the concentration unevenness amendment section 237 which consists of the test pattern print section for concentration unevenness amendment (only henceforth HS) and the test pattern read station which prepared outside the field of the above-mentioned print. 213 is the print medium for test patterns formed in the scan location of the vertical carriage which can be printed by the 1st and 2nd print section 11 and the ink jet head of 11', is laid between roller 216A and 216B, and is conveyed by motor 216M in the direction of D in drawing. And the print medium 213 by which the test pattern was printed is illuminated according to the light source 218 like the above-mentioned. Read

the print density of the test pattern printed by each ink jet head on up to the print medium 213, and it reads with a line sensor 217. After digital-signal-izing the read signal of the test pattern print by each print head read by the read sensor 217 with A/D converter 236 as R, G, and a B signal, the read signal is temporarily memorized to RAM219.

[0046] (3.2) Explain the configuration of the control system of equipment, next the configuration of the control system of this equipment. Drawing 6 and drawing 7 show the configuration of the ink jet printer of an example, and the example of a configuration of the control unit, and drawing 8 - drawing 10 show notionally an example of the internal configuration of the control board 102 of drawing 6 along with data flow.

[0047] The image data for printing is sent to the control board 102 through an interface (here GPIB) from a host computer H. The off-line which is not limited and minds the transfer by the network, a magnet tape, etc. as a transfer gestalt is sufficient as especially the equipment that sends image data. The control board 102 consists of each part shown by RAM102C and drawing 8 which have CPU102A, ROM102B which stored various programs, various register fields, and a working-level month field - drawing 10, and others, and controls the whole equipment. 103 is the actuation and a display which has a drop for displaying the message to a control unit and an operator for an operator giving necessary directions to Printer P etc. 104 is a cloth conveyance machine which consists of a motor for conveying print media, such as cloth which is a candidate for a print, etc. 105 is the driver unit I/O section for driving the various motors ("M" being given to the tail) shown in drawing 7, and various solenoids ("SOL" showing). 107 is an extension board for receiving the information (information, such as a color which the existence of wearing and its head present) concerning each head, and supplying the control board 102 while supplying a driving signal to each head. The information concerned is transmitted to a host computer H as mentioned above.

[0048] Now, if the information on the image data printed from a host computer H is received, the image data will be accumulated in an image memory 505 through the GPIB interface 501 and the frame memory controller 504 (refer to drawing 8). the image memory of an example -- the capacity of 124 M bytes -- having -- A1 size -- 8 bits -- a pallet data configuration is carried out. That is, 8 bits per pixel are assigned. 503 is a DMA controller for improvement in the speed of a memory transfer. If the transfer from a host computer H is completed, printing can be started after predetermined processing.

[0049] Although explanation gets mixed up, the host computer connected to the airline printer of an example transmits image

data as a raster image. Since two or more ink regurgitation nozzles are located in a line with the lengthwise direction, each print head must be changed so that an image data list may be agreed in a print head. The raster @BJ conversion controller 506 performs this data conversion. And the expansion function of the following expansion controller 507 for carrying out variable power of the image data is supplied to the data changed by this raster @BJ conversion controller 506 by the through pallet conversion controller 508. In addition, the data to the expansion controller 507 are data sent from the host computer, and are a 8-bit pallet signal in this example. And this pallet data (8 bits) is passed common to the processing section (it explains below) to each print head, and is processed.

[0050] In addition, below, when the number of print heads is eight, it explains as what is equipped with the head which memorizes the specific color S1 - S4 besides yellow, a Magenta, cyanogen, and black.

[0051] Now, the pallet conversion controller 508 supplies the pallet data inputted from the host computer H, and the corresponding translation table of a color to the translation table memory 509.

[0052] In the case of a 8-bit pallet, the color type in which the reappearance is possible is 256 kinds to 0-255, and is developed by the table memory 509 which corresponds as a table for every color.

[0053] When in the case of a 8-bit pallet the color type in which the reappearance is possible is 256 kinds to 0-255, for example, 0 is inputted When the printing 1 of thin gray is inputted When the solid printing 2 of the special feature 1 is inputted When the solid printing 3 of the special feature 2 is inputted When the printing 4 of the color of a blue system is inputted with the color mixture of cyanogen and a Magenta When the solid printing 5 of cyanogen is inputted When the printing 254 of the color of a let system is inputted with the color mixture of a Magenta and yellow When the solid printing 255 of yellow is inputted Processing in which nothing is printed is performed.

[0054] As concrete circuitry, the pallet translation table memory 509 achieves the function by writing translation data in the address position to pallet data. That is, when pallet data are actually supplied as the address, memory is accessed in read-out mode. In addition, the pallet conversion controller 508 performs management of the pallet translation table memory 509, and the interface of the control board 102 and the pallet translation table memory 509. Moreover, about the special feature, the circuit (circuit which doubles an output 0-1) which sets up the amount of special-feature mixing can be inserted between HS systems which consist of the HS controller 510 and HS translation

table memory 511 of the next step, and the amount of setup can also be made adjustable.

[0055] HS conversion controller 510 and HS translation table memory 511 amend variation in the printing concentration corresponding to each delivery of each head based on the data measured with the head property measurement means 108 containing the concentration unevenness amendment section shown in drawing 5 . For example, data conversion is carried out to deep \*\* to the delivery where concentration is thin (there is little discharge quantity), data conversion is made into thinness to the delivery where concentration is deep (there is much discharge quantity), and processing in which it passes as it is to the delivery like inside is performed. About this processing, it mentions later.

[0056] Following gamma conversion controller 512 and gamma translation table memory 513 are table conversion for making the whole concentration deep or making it thin for every color. For example, when doing nothing, it is a linear table and they are [ output / 210 output 255 ] 255 outputs in 100 output 210 input to 0 output 100 input in zero input.

[0057] The binary-ized controller 514 of the next step has a false gradation function, inputs 8-bit gradation data and outputs the 1-bit false gradation data made binary. What is necessary is to adopt these also in the example, although a thing, an error diffusion method, etc. which are depended on a dither matrix are one of those which change multiple-value data into binary data, and just to carry out the gradation expression of it by the number of the dots per unit area anyway, although the detailed explanation is omitted.

[0058] The data made binary here are used as each object for a print head drive, after being stored in the bond memory 515. And the binary data outputted from each bond memory are outputted as C, M, Y, BK, S1 - S4. Since same processing is carried out, here explains the binary-ized signal of each color using drawing 10 paying attention to the binary data C. In addition, this drawing is a configuration to print color cyanogen, and has the same configuration for every color. In addition, drawing 10 is the block diagram showing latter circuitry rather than the bond memory 515 shown in drawing 8 and drawing 9 .

[0059] Although the signal C made binary is outputted towards the sequential multi-scan generator (following SMS generator) 522, since test printing of an equipment simple substance may be carried out with a pattern generator 517, 518, the data concerned are supplied to a selector 519. Of course, this switch is controlled by CPU of the control board 102, and when an operator performs predetermined actuation to a control unit 103 (refer to drawing 6 ), it chooses the data from the binary pattern controller 517 that test printing should be carried out.

Therefore, the data from the binary controller 514 (bond memory 516) are usually chosen. 520 is the LOGO input section inserted between the selector 520 and the SMS generator 522, and since logo marks, such as a brand of a manufacturer and a designer, are put into the edge of cloth in many cases in textile printing, it corresponds to this. The configuration shall consist of memory which stores for example, LOGO data, a controller which manages a print position etc., and can perform necessary assignment etc. at the step MS 11 of drawing 2 .

[0060] In addition, the SMS generator 522 prevents the concentration nonuniformity of the image by the discharge quantity change for every nozzle. The multi-scan is proposed as Japanese Patent Application No. No. 79858 [ four to ]. It can be specified at the step MS 21 of drawing 2 whether priority is given to image quality, as a multi-scan is performed, namely, the ink regurgitation is performed from two or more deliveries to 1 pixel, or priority is given to rapidity, without performing such a multi-scan. About the print method controlled by this SMS generator 522, it mentions later.

[0061] The bond memory 524 is buffer memory which amends the physical location of a head, i.e., the location between the vertical print sections, and the location between each head, once inputs image data here and outputs it to the timing according to the physical location of a head. Therefore, in this bond memory 524, those capacity differs for every print color.

[0062] After carrying out the above data processing, data are sent to a head through the head extension board 107.

[0063] By the way, fixed maintenance of the data for pallet conversion and gamma conversion was carried out conventionally at the memory prepared in the body of equipment. Therefore, image data to output may not be suited and the image of sufficient grace might not be obtained. So, in this example, these data for conversion make an input possible from the exterior, and were stored in each translation table memory. Pallet translation data is downloaded in the translation table memory 509. That is, the translation table memory 509,511,513 of an example is altogether constituted by RAM. And the data for pallet conversion and gamma conversion were sent from the host computer 101. Moreover, the data for HS conversion are inputted from the head property measurement machine 108 including the configuration shown in drawing 5 , and it enabled it to obtain the data always set by the condition of a head. In order to acquire the head property of each print color with the head property measuring instrument 108, test printing (print of uniform predetermined halftone concentration) is performed by each print head. And it carries out by measuring the concentration distribution corresponding to the print width of face. The condition of this head is how many [

desired concentration and ] concentration of dispersion of the discharge condition of two or more nozzles contained in a head, or the image after being printed by the head differ.

[0064] Moreover, in this example, in order to prevent prevention of an abnormality output etc. until the parameter for conversion is inputted, an output is set to 0 and printing was made not to carry out, even if data inputted, as shown in drawing 8 . The same is said of gamma conversion.

[0065] (3.3) The explanation sequential multi-scan of a print method is the technique of printing the same Rhine in the head migration direction in two or more deliveries, in order to amend concentration dispersion between each delivery produced by dispersion in the magnitude of the ink droplet which carries out the regurgitation in each delivery, and dispersion of an ink discharge direction. Thus, by forming one Rhine in two or more deliveries, reduction of nonuniformity can be aimed at using the random nature of a regurgitation property. When it scans in this twice and a sequence multi-scan is performed to it, Perform this with the head by the side of 2nd print section 11' shown in 1st print section 11 side the head and the bottom shown in the drawing 4 bottom, and also By using the upper half of a head with the 1st scan about one head, and using a lower half with the 2nd scan, oddth of the print data of the head migration direction is printed by the delivery group of an upper half, and the eventh piece can be printed by the delivery group of a lower half. This is a means to prevent deterioration of the print grace by the nonuniformity of the ink regurgitation which it has for every regurgitation of an ink jet head, and can acquire the effectiveness near head shading.

[0066] Drawing 11 - drawing 14 show selectable various print methods by this example.

[0067] [Printing mode I] drawing 11 is a print in the usual 2 times multi-scan which used the head by the side of the 1st print section, and the head by the side of the 2nd print section. the area which indicated the area printed with the head of the bottom in the 1st print section 11 side to be "bottom 1", "bottom 2", and "bottom 3", and was printed with the upper head -- "-- upper 1" -- "-- upper 2" -- "-- it is indicated as upper 3."

[0068] A cloth feed direction is as an illustration arrow head, and 1 time of a step feed per revolution is head width of face. As shown in drawing, the data which all fields are constituted from an upper half of a top head, the lower half of a bottom head and the lower half of a top head, and an upper half of a bottom head, and each head strikes obtain predetermined concentration, as a result of being thinned out and piling up with both heads. The head scan speed at this time is  $V1 \times 2$ .

[0069] [Printing mode II] drawing 12 is the case where printing

concentration is doubled compared with drawing 11 . The differences from drawing 11 are having not thinned out print data and setting carriage speed to one half. In the SMS generator 522 of drawing 10 , in the case of drawing 11 , data distribution is performed, but in the case of drawing 12 , this is not performed. Moreover, the reason for setting speed to one half relates to the in chestnut FIRU frequency of a head.

[0070] Compared with drawing 11 , [printing mode III] drawing 13 loses infanticide, and is doubling the cloth feed per revolution. Moreover, up-and-down head spacing is changed into the integral multiple of the head width of face L0. Therefore, although the 1st and 2nd print section 11 in drawing 4 and the means which carries out adjustable setting of the spacing of 11' can also be established, a print as shown in this drawing can also adjust a cloth feed per revolution and the scanning timing of a vertical head, even if head spacing is " $(N+0.5) \times L0$ " like drawing 11 and drawing 12 .

[0071] [Printing mode IV] drawing 14 shows the print method of further others. This is made to print with scanning twice what was printing with scanning an up-and-down head twice [ a total of ] once, respectively a total of 4 times about an up-and-down head, respectively at drawing 11 . With the SMS generator 522, thin out and it is, and it is not necessary to make the mode without /infanticide from this method, and there is a merit that it is not necessary to switch the speed of a scanner and that simplification on a design can be performed, by it.

[0072] (3.4) It is a configuration for performing concentration unevenness amendment concerning explanation this invention of head shading, and in here, the picture signal read in the test pattern mentioned later will be sent to the image formation section, and drive condition amendment of a print head will be presented with it like the after-mentioned.

[0073] The semantics of adjusting in this invention, so that concentration unevenness may not occur at the time of image formation The image concentration by the drop from two or more liquid deliveries of a print head is equalized by the print head itself, Or it is what at least one thing equalized in order [ that ] for the request color color by equalizing the image concentration for every two or more heads or two or more liquid mixing to be obtained by the request color or to make it obtained by request concentration contains. Satisfying these plurality preferably is included.

[0074] It is desirable that read automatically the criteria print which gives amendment conditions as a concentration equalization amendment means for that, and amendment conditions are determined automatically, and it does not refuse to add the object for fine tuning, and the hand-regulation equipment for user adjustment to



this.

[0075] The amendment purpose called for according to amendment conditions can apply what is adjusted to predetermined within the limits including not only the optimal print conditions but also tolerance, and all the things that the criteria concentration which changes according to a request image is sufficient as, and are contained in the meaning of amendment.

[0076] The case of the concentration unevenness amendment of the multi-head of the print total element number N carried out to completing the printed output of each component to an average concentration value as an amendment purpose as an example is explained.

[0077] When you drove and print each component (1 - N) with a certain homogeneity picture signal S, suppose that concentration distribution has arisen.

[0078] Concentration OD1 -ODN of the part first corresponding to each print component It measures and is [0079].

[External Character 1]

[0080] \*\*\*\*\*. This average concentration may not be restricted for every component, but may be performed by the approach of integrating with the amount of reflected lights and calculating the average, or the well-known approach.

[0081] If [ whose relation between the value of a picture signal, a certain component, or the output concentration of a certain elements is / like drawing 15 (A) ], the signal actually given to these component or these elements should just define the correction factor alpha which amends Signal S and brings about the purpose concentration bar OD. Namely, what is necessary is just to give S of the amendment signal which amended Signal S to  $\alpha S = (\bar{OD}/OD_n) \times S$  to this component or group according to an input signal S. It performs by specifically performing table conversion like drawing 15 (B) to an input picture signal.

[0082] In drawing 15 (B), although a straight line A is a table outputted without an inclination's being the straight line of 1.0 and completely changing an input signal, an inclination is the straight line of  $\alpha = \bar{OD}/OD_n$ , and a straight line B is a table which changes an output signal into  $\alpha S$  to an input signal S. therefore, the picture signal corresponding to the n-th print component -- receiving -- correction factor alphan for every table like the straight line B of drawing 15 (B) If a head is driven after performing table conversion for which it opted, each concentration of the part printed with the print component of N individual will become equal to Bar OD. If such processing is performed to a printall component, concentration unevenness will be amended and a uniform image will be obtained. That is, if

it asks for the data what kind of table conversion should be carried out to the picture signal corresponding to which print component, beforehand, amendment of concentration unevenness will be attained.

[0083] This purpose amendment is performed by the concentration comparison of each nozzle group (three - 5 unit), and it cannot be overemphasized that it is good also as approximation-equalization processing.

[0084] Although it is possible to amend concentration unevenness by such approach, since it is also expected that concentration unevenness occurs after that by the busy condition and environmental variation of equipment, or change of the concentration unevenness situation before amendment and a change of an amendment circuit with time, in order to cope with such a situation, it is necessary to change the amount of amendments of an input signal. It is possible that the sludge out of ink adheres near an ink delivery, or the foreign matter from the outside adheres along with use as this cause in the case of an ink jet print head, and concentration distribution changes. This is a thermal head and is predicted also from degradation and deterioration of each heater arising and concentration distribution changing. In such a case, in the amount of input amendments set up the first stage at the time of manufacture etc., for example, since concentration unevenness amendment is no longer performed fully, it becomes the technical problem which should also solve the technical problem that concentration unevenness is conspicuous gradually along with use, in long-term use. Then, rewriting of head shading of amendments as shown below (HS), i.e., the amount, is performed.

[0085] Drawing 16 shows the example of a configuration of the concentration unevenness amendment concerning this head shading. Here, h is a print head and is shown on behalf of each head in the 1st and 2nd print section of drawing 4 .

[0086] 718 is an unevenness amendment signal and 717 is the unevenness amendment RAM. Moreover, when 720 performs suction etc., the regurgitation recovery means for making the discharge condition of a print head h good and 725 are means to make a print head scan to a print medium thru/or the print medium for test patterns.

[0087] As mentioned above per drawing 9, the signal 704 by which pallet conversion was carried out is changed by each HS translation table memory 509 so that the unevenness of a print head may be amended. The unevenness amendment table constituted in this memory 509 has 64 amendment straight lines, and will switch an amendment straight line (or it can also consider as a nonlinear curve) according to the unevenness amendment signal 718.

[0088] Drawing 17 shows an example of an unevenness amendment table, in this example, has 64 amendment straight lines from which the inclination from  $Y=0.68X$  to  $Y=1.31X$  differs every [ 0.01 ], and switches an amendment straight line according to the unevenness amendment signal 718. For example, when the signal of the pixel which the diameter of a dot prints in a large delivery inputs, a picture signal is amended by choosing the small amendment straight line of an inclination and choosing the large amendment straight line of an inclination conversely at the time of the small delivery of the diameter of a dot.

[0089] The selection signal of an amendment straight line required for the unevenness amendment RAM 717 to perform unevenness amendment for every delivery is stored. That is, 64 kinds of selection signals shown with the value of 0-63 are stored by a total of delivery several minutes or, and the required delivery. In the above configuration, if a use delivery is chosen by the use delivery selection means 710 which is mentioned later, CPU102A will supply a use delivery selection signal to RAM717 according to this. This outputs synchronizing with the picture signal which inputs the unevenness amendment signal 718 which chooses the amendment straight line corresponding to the delivery where RAM717 was chosen in unevenness amendment. And gamma conversion is presented with the signal with which concentration unevenness was amended by the amendment straight line chosen by the unevenness amendment signal as mentioned above about drawing 9 .

[0090] By performing the above unevenness amendment processings, the regurgitation energy generation component corresponding to the delivery of a part with the deep concentration of a head lowers drive energy (for example, drive duty), and the regurgitation energy generation component corresponding to the delivery of a conversely thin part raises drive energy. Although print head concentration unevenness will be amended as a result and a uniform image will be obtained, when the concentration unevenness pattern of a head changes along with use, the used unevenness amendment signal becomes unsuitable and unevenness occurs on an image. When such, the below-mentioned unevenness amendment data are rewritten.

[0091] If correspondence with HS conversion controller 510 in drawing 9 and the translation table memory 511, and drawing 16 is explained, in this example, it can be referred to as ROM which table-sized each of a correction curve as shows HS translation table memory 509 to drawing 17 , and stored it, and unevenness amendment RAM 717 can be used as the component of HS conversion controller 510.

[0092] One example of head shading which rewrites hereafter the contents of the unevenness amendment RAM in the configuration of

the concentration unevenness amendment mentioned above with reference to drawing 16 etc. according to the concentration property of each delivery at the time is explained.

[0093] (Example 1) Drawing 18 is a flow chart which shows the procedure of the head shading processing concerning one example of this invention.

[0094] Starting of this procedure performs regurgitation stabilization actuation by head recovery / initialization at a step SP 1 first. This is because there is a possibility that it may become impossible to recognize the property (concentration unevenness) of a faithful head when having changed into the condition of not having a regurgitation property with a normal print head by thickening of ink, dust, mixing of air bubbles, etc. and concentration unevenness amendment processing is performed as it is.

[0095] Regurgitation stabilizing treatment is faced and they are a print head h and the above-mentioned regurgitation recovery means 720. The cap which is a component is countered and joined and forced discharge of the ink can be carried out from a delivery by drawing in through the cap. Moreover, the contact to a delivery forming face or the Ayr spraying of an ink absorber, wiping, etc. which can be arranged in a cap unit can clean a delivery forming face. Moreover, a print head is usually driven like the time of a print, and the reserve regurgitation can be made to perform. However, the drive energy at the time of the reserve regurgitation may not necessarily be the same as that of the time of a print. Namely, what is necessary is just to perform the same processing as the so-called regurgitation recovery action performed in an ink jet printing equipment.

[0096] In addition, it can replace with the above processings or the pattern for regurgitation stabilization can also be printed on the print medium 213 for test patterns after that. And what is necessary is just to print the test pattern for concentration unevenness amendment etc. after that.

[0097] Next, although print of a test pattern (it is also called a test image) and its read are performed at steps SP3 and SP5, respectively, the mode of the print performed by this example and read is explained below.

[0098] An example of a test image print (printing) procedure (the step SP 3 of drawing 18) is shown below. In this procedure, it judges whether it is set as multi-scan mode as made move to the 1st and 2nd print section 11 of a step, and the test pattern (test image) print position which showed the carriage of 11' (refer to drawing 4 ) to drawing 5 first, next shown in drawing 11 , drawing 12 , and drawing 14 , or it is set as the high-speed printing mode as shown in drawing 13 .

[0099] When judged with being set as fast mode (the

above-mentioned printing mode III), the following head shading is performed.

[0100] First, a test pattern as shown, for example in drawing 20 (A) is formed with one scan each of the bottom head 13 and top head 13', respectively.

[0101] That is, as shown in drawing 20 (A), many numbers have the ink jet head 13 rather than the delivery used for an actual print delivery N (for example, eight deliveries become excessive on both sides), and it prints a test pattern by one scan using all these deliveries.

[0102] When printing a test pattern incidentally using the above ink jet heads 13, it becomes print actuation as shown in drawing 20 (B).

[0103] In addition, although how to choose a field without defects who appoint the delivery to be used beforehand as an approach of choosing the delivery used for an actual print, such as a kink of an approach, the non-regurgitation, or the regurgitation, the approach of choosing according to register doubling, etc. can be considered, the approach which is not restricted to this but chooses the range of the delivery to be used as arbitration according to the print approach may be used.

[0104] After ending the test pattern print of the above step SP 3 with reference to drawing 18 again, in a step SP 5, the read head performs read of a test pattern in the direction of R shown in drawing 20 (A).

[0105] Drawing 21 (A) shows the read result. In order to have an excessive delivery and to perform the print by these from now on so that clearly, it is not generated but the fall of read concentration as shown in drawing 23 (A) on the boundary of a real print field reflects the thing near the more nearly actual concentration property of the delivery near the boundary.

[0106] Even if the read result of drawing 21 (B) shown as an example of a comparison is based on a multiple-times scan as shown in drawing 20 (B) and it compares with this result, the result shown in drawing 21 (A) can be called what the concentration property of a real print field edge reflected good.

[0107] If drawing 18 is referred to again, at a step SP 7, the concentration data corresponding to the delivery beforehand chosen by the use delivery selection means 710 (refer to drawing 16 ) will be chosen. In addition, in this example, the above-mentioned use delivery selection means 710 can be used as the data for selection beforehand stored in the register.

[0108] Next, based on the concentration data which made [ above-mentioned ] selection, correction value is calculated by the above-mentioned approach at steps SP9-SP11, and the amendment signal for choosing the amendment straight line of HS translation table memory 509 (refer to drawing 16 ) based on the result is

stored in the unevenness amendment RAM 717 (refer to drawing 16 ) for every delivery at steps SP13 and SP15.

[0109] (Example 2) This example shows the shading processing at the time of judging that multi-scan mode (I), i.e., a printing mode, (II), and (IV) were chosen.

[0110] As shown in drawing 19, like the above-mentioned example 1, each test image is formed by one scan about vertical each ink jet head, respectively, and read is performed similarly (steps SP1-SP5).

[0111] The test pattern which consists of this one scan also in this case performs image formation using all the deliveries of an ink jet head.

[0112] Next, each read concentration data is saved at a step SP 107. And the concentration data which correspond, respectively about use delivery 1-n set up by register adjustment at a step SP 109 are chosen for every head.

[0113] The concentration data for every head of this are compounded according to a (printing mode I) (II) (IV) pile printing gestalt (step SP 111), and perform head shading conversion.

[0114] For example, in a printing mode (I), (II), and (IV), the concentration data in the upper half of bottom head ( $1 - n/2$ ) are added for the concentration data in the lower half of bottom head ( $n/2+1-n$ ) to the concentration data in the lower half of a top head ( $n/2+1-n$ ) to the concentration data in the upper half of top head ( $1 - n/2$ ). That is, the concentration when adding with the concentration data of a single head and piling up is predicted so that it may correspond to how to pile up each head.

[0115] Based on this synthetic concentration data, like an example 1, concentration equalization (step SP 113) and count (step SP 115) of correction value are performed, and amendment data are saved at the unevenness amendment RAM (steps SP117 and SP119).

[0116] This drawing 24 is the typical sectional view showing the textile-printing equipment concerning other examples of this invention.

[0117] The discharge direction of an ink jet head as shown in this drawing can use this invention also in downward equipment. In this case, in applying HS to this example equipment, for example, the printer section is once evacuated, the sheet-like print medium for test pattern formation (henceforth HS sheet) is stuck on a conveyance belt, the printer section is again returned to the original location, HS actuation is started, and it is possible that formation of a test pattern is made to be performed. Moreover, HS sheet after termination of operation can think of removing this, after conveying to the position which is easy to remove, or making it remove, after evacuating the printer

section similarly again.

[0118] However, with this example equipment, since the configuration which can slide the printer section 1000 for the maintenance of the conveyance section 20100 is adopted, while HS processing is made to be performed, using the space of the slide place effectively, improvement in the workability at the time of AHS processing is aimed at, and the configuration which the precision of test pattern formation and the accuracy of reading can improve further is adopted.

[0119] As a configuration for that, as shown in drawing 24, the HS station 21600 which \*\*\*\* and performs the print of a test pattern etc. in the upper part of a roller 2011 at the time of operation of HS processing mode (this may be performed using the time of the maintenance of the conveyance section, and is good in a line suitably) is formed. although the printer section 21000 moved horizontally towards the HS station 21600 with the slide rail 20105 from the location at the time of the usual print (upper part of the conveyance belt 20130), it was prepared in the printer section at this time -- it sticks, and a roller 20150 is evacuated so that it may not interfere in HS station by the air cylinder 21520.

[0120] And positioning of the printer section 21000 to HS station is performed by the stopper formed in the edge of the slide rail 20105. After migration of the printer section 1000 cancels positioning in the usual print position, an operator can move it to the AHS station 1000, or you may make it move it by the driving means of a pneumatic cylinder, an oil hydraulic cylinder, an electric motor, etc.

[0121] HS sheet sticks and creates each print sheet using a double-sided tape, a spray paste, adhesives, etc. so that a float may not arise to the attachment plate which has the smoothness formed by the metal, resin, etc.

[0122] The test pattern for one scan recorded by every head and all deliveries can be printed like examples 1 and 2 to this HS sheet, and concentration unevenness amendment can be performed based on this.

[0123] In addition, although the above example explained the printing equipment of an ink jet method, application of this invention is not restricted to this, but, of course, it can use for printing equipments, such as a hot printing method.

[0124] (in addition to this) Although not only the ink-jet print method mentioned above but various print methods can be used in addition for this invention, in adopting an ink-jet print method, it has a means generate heat energy as energy used also in it in order to make the ink regurgitation perform, and the effectiveness excellent in using the print head of the method which makes the change of state of ink occur with said heat

energy, i.e., the Bubble Jet which Canon, Inc. advocates, and a printing equipment brings about. It is because the densification of a print and highly minute-ization can be attained according to this method.

[0125] About the typical configuration and typical principle, what is performed using the fundamental principle currently indicated by the U.S. Pat. No. 4723129 specification and the 4740796 specification, for example is desirable. Although this method is applicable to both the so-called mold on demand and a continuous system On the electric thermal-conversion object which is especially arranged corresponding to the sheet and liquid route where the liquid (ink) is held in the case of the mold on demand By impressing at least one driving signal which gives the rapid temperature rise which supports print information and exceeds nucleate boiling Since make an electric thermal-conversion object generate heat energy, the heat operating surface of a print head is made to produce film boiling and the air bubbles in the liquid (ink) corresponding to this driving signal can be formed by one to one as a result, it is effective. A liquid (ink) is made to breathe out through opening for regurgitation by growth of these air bubbles, and contraction, and at least one drop is formed. If this driving signal is made into the shape of a pulse form, since growth contraction of air bubbles will be performed appropriately instantly, the regurgitation of a liquid (ink) excellent in especially responsibility can be attained, and it is more desirable. As a driving signal of the shape of this pulse form, what is indicated by the U.S. Pat. No. 4463359 specification and the 4345262 specification is suitable. In addition, if the conditions indicated by the U.S. Pat. No. 4313124 specification of invention about the rate of a temperature rise of the above-mentioned heat operating surface are adopted, the further excellent print can be performed.

[0126] As a configuration of a print head, the configuration using the U.S. Pat. No. 4558333 specification and U.S. Pat. No. 4459600 specification which indicate the configuration arranged to the field to which the heat operation section other than the combination configuration (a straight-line-like liquid flow channel or right-angle liquid flow channel) of a delivery which is indicated by each above-mentioned specification, a liquid route, and an electric thermal-conversion object is crooked is also included in this invention. In addition, the effectiveness of this invention is effective also as a configuration based on JP,59-138461,A which indicates the configuration whose puncturing which absorbs the pressure wave of JP,59-123670,A which indicates the configuration which uses a common slit as the discharge part of an electric thermal-conversion object to two or more electric



thermal-conversion objects, or heat energy is made to correspond to a discharge part. Namely, no matter the gestalt of a print head may be what thing, it is because it can print now efficiently certainly according to this invention.

[0127] In addition, the print head of the ability to constitute corresponding to the gestalt of a printing equipment shall be natural, and should just arrange the delivery over the range corresponding to the width of face of a print medium to the so-called thing of a line printer gestalt. Moreover, this invention is effective also when the print head exchangeable chip type to which the electric connection with the body of equipment and supply of the ink from the body of equipment are attained by the print head fixed to the body of equipment or the body of equipment being equipped, or the print head of the cartridge type with which the ink tank was formed in the print head itself in one is used as a print head of a serial type like an upper example.

[0128] Moreover, as a configuration of the printing equipment of this invention, since the effectiveness of this invention can be stabilized further, it is desirable to add the regurgitation recovery means of a print head, a preliminary auxiliary means, etc. If these are mentioned concretely, a preheating means to heat using the capping means, the cleaning means, the pressurization or the suction means, the electric thermal-conversion object, the heating elements different from this, or such combination over a print head, and a reserve regurgitation means to perform the regurgitation different from a print can be mentioned.

[0129] Furthermore, in addition, in this invention example explained above, although ink is explained as a liquid It is ink solidified less than [ a room temperature or it ], and what is softened or liquefied at a room temperature may be used. Or by the ink jet method, since what carries out temperature control is common as a temperature control is performed for ink itself within the limits of 30 degrees C or more 70 degrees C or less and it is in the stabilization regurgitation range about the viscosity of ink, ink may use what makes the shape of liquid at the time of use print signal grant. In addition, in order to prevent the temperature up by heat energy positively because you make it use it as energy of the change of state from a solid condition to the liquid condition of ink, or in order to prevent evaporation of ink, the ink which solidifies in the state of neglect and is liquefied with heating may be used. Anyway, ink liquefies by grant according to the print signal of heat energy, and this invention can be applied also when using the ink of the property which will not be liquefied without grant of heat energy, such as that by which liquefied ink is breathed out, and

a thing which it already begins to solidify when reaching the medium for a print. The ink in such a case is good for a porosity sheet crevice or a through tube which is indicated by JP,54-56847,A or JP,60-71260,A also as liquefied or a gestalt which counters to an electric thermal-conversion object in the condition of having been held as a solid. In this invention, the most effective thing performs the film-boiling method mentioned above to each ink mentioned above.

[0130] Furthermore, in addition, as a gestalt of this invention, although used as an image printing terminal of information management systems, such as a computer, the gestalt of the reproducing unit combined with others, a reader, etc. may be taken.

[0131] Moreover, although this invention is applicable to the image formation equipment which prints on various print media When applying to textile-printing equipment like an upper example, in performing ink jet textile printing especially to a textile Sufficient concentration may be made to color (1) ink as the textile for ink jet textile printing, (2) Engine performance, such as that the percentage exhaustion of ink is high, that (3) ink dries promptly on a textile, that there is little generating of a blot of the irregular ink on (4) textiles, and excelling in the conveyance nature within (5) equipment, is required. In order to satisfy these military requirements, in this invention, it can pretreat beforehand to a textile if needed. For example, the proposal of the textile which the textiles which have an ink absorbing layer in JP,62-53492,A are indicated [ textile ], and made the reduction inhibitor and the alkaline substance contain in JP,3-46589,B is made. The processing which makes the matter chosen as a textile from an alkaline substance, a water soluble polymer, synthetic macromolecule, a water-soluble metal salt, a urea, and thiourea contain as an example of such pretreatment can be mentioned.

[0132] As an alkaline substance, carbonic acid, such as amines, such as hydroxylation alkali metal, such as a sodium hydroxide and a potassium hydroxide, monochrome, JI, and triethanolamine, a sodium carbonate, potassium carbonate, and sodium bicarbonate, or a heavy carbonic acid alkali-metal salt is mentioned, for example. Furthermore, there are organic-acid metal salts, ammonia, ammonium compounds, such as calcium acetate and barium acetate, etc. Moreover, the sodium trichloroacetate which serves as alkali matter under steaming and dry heat can be used. As a desirable alkaline substance, there are the sodium carbonate and sodium bicarbonate which are used for dyeing of reactive dye especially.

[0133] As a water soluble polymer, natural water solubility macromolecules, such as protein matter, such as polysaccharide,

such as cellulose system matter, such as starch matter, such as corn and wheat, a carboxymethyl cellulose, methyl cellulose, and hydroxyethyl cellulose, sodium alginate, gum arabic, low KASUITO bean gum, tragacanth gum, Cyamoposis Gum, and a tamarind seed, gelatin, and casein, tannin system matter, and lignin system matter, are mentioned.

[0134] Moreover, as synthetic macromolecule, a polyvinyl alcohol system compound, a polyethylene oxide system compound, an acrylic-acid system water soluble polymer, a maleic-anhydride system water soluble polymer, etc. are mentioned, for example. A polysaccharide system macromolecule and a cellulose system macromolecule are desirable also in these.

[0135] As a water-soluble metal salt, for example like the halogenide of alkali metal and alkaline earth metal, typical ionic crystal is made and the compound which is pH 4-10 is mentioned. as a typical example of this compound, NaCl, Na<sub>2</sub> SO<sub>4</sub>, KCl, CH<sub>3</sub> COONa, etc. mention with alkali metal, for example -- having -- moreover -- as alkaline earth metal -- CaCl<sub>2</sub> And MgCl<sub>2</sub> etc. -- it is mentioned. The salts of Na, K, and calcium are desirable especially.

[0136] Although especially the method of making a textile contain the above-mentioned matter etc. in pretreatment is not restricted, it can mention the dip coating usually performed, the pad method, a coating method, a spray method, etc.

[0137] Furthermore, since the textile-printing ink given to the textile for ink jet textile printing has only adhered in the condition of having given on the textile, it is desirable to give the fixing process of the coloring matter in ink, such as a color to fiber, succeedingly. A conventionally well-known approach is sufficient as such a fixing process, for example, when not using the steaming method, the HT steaming method, the thermostat fixing method, and the textile that carried out alkali treatment beforehand, the alkali pad steam method, the alkali blotch steam method, an alkali shock procedure, the alkali cold fixing method, etc. are mentioned. Moreover, a fixing process has some from which there are a thing including a reaction process and a thing which is not included, fiber is infiltrated as a latter example, and it does not secede physically by the color. Moreover, if it has necessary coloring matter as ink, a proper thing can be used, and it is not restricted to a color, but a pigment may be included.

[0138] According to a well-known approach, washing can perform conventionally removal of the matter used for removal and pretreatment of a still more nearly unreacted color after the above-mentioned reaction fixing process. In addition, it is desirable to use the conventional fix processing together in the case of this washing.

[0139] The print object with which the tail end process described above was given is separated by desired magnitude after that, a process for the separated piece to obtain final workpieces, such as attaching by sewing, adhesion, and joining, is given, and clothing and quilt covers, such as a dress, DRESS, a necktie, and a swimming suit, sofa covering, a handkerchief, a curtain, etc. are obtained. Many approaches of processing a textile by sewing etc. and using as clothing or other daily necessities are indicated by well-known books, such as "a manual made from newest Nitto" (SENI journal company issue), and a monthly "\*\*\*\*\*" (cultural publication station issue).

[0140] In addition, as a medium for a print, the various things which can give a predetermined liquid are mentioned using other tabular object and ink jet techniques, such as a textile, wall cloth, yarn used for embroidery, wallpaper, paper, a transparency sheet, and alumite, and it does not ask that a material, weave, and how to knit are textiles, but all textiles, a nonwoven fabric, and other cloth are included.

[0141]

[Effect of the Invention] As explained above, according to this invention, a test image is printed using many numbers of record components, it disappears by this that the part corresponding to the record component used for an actual print in a test image serves as an edge of the test image concerned from the record component used on a print, and the effect of being the image edge can be eliminated in the read result.

[0142] While being able to print the test image of one line for as a result performing concentration unevenness amendment and being able to perform good amendment based on that result, in case 2 test images which can shorten the working hours which 1 concentration unevenness amendment takes are acquired, the effectiveness of \*\* that an equipment configuration is simplified can be acquired by considering as the conveyance needlessness of the sheet for test images.